THE EPILEPTIC INTERVAL—ITS PHENOMENA AND THEIR IMPORTANCE AS A GUIDE TO TREATMENT.

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(*Concluded.*)

(10).—Nose and Ears.

The frequent close connection between nasal and aural affections is especially important in these cases.

(*a*) Nasal troubles (obstruction, mouth-breathing, so-called "snuffles," fœtor, naso-pharyngeal catarrh), apparently having some causative relation to the epilepsy, are not very rare, though scarcely more common than in average children. They are nearly all related to hypertrophied tonsils, and perhaps even to the enlarged lymphatic glands already considered. The relation of eneuresis has been mentioned, and the condition termed aprosexia might be added. A case of "nasal epilepsy," with some historical notes, was recently published by Roe (Transactions N. Y. State Medical Society, 1890).

(*b*) Ear troubles. Many of these are connected with the naso-pharyngeal affections. Boucheron (1885) described an auricular epilepsy occurring in childhood and youth, and other observers have recorded cases originating from ear disorders (either directly from irritation of the adjacent dura, or as a reflex). The favorable local conditions here for retention and pressure, as well as the consequent exquisite painfulness of inflammatory and exudative processes may explain the readiness with which convulsions are produced.

Although little attention was paid to aural symptoms, some note of them was made in twenty cases. Tinnitus (ringing, hammering, buzzing in the ears) occurred in twelve. In three it was only on one side; in one an aura;

in few, if any, was it continuous; in a few it came at particular times, as on going to sleep or on waking. Tinnitus aurium, apart from distinct dizziness or adequate ear trouble, is then not rare in one or both ears—probably oftener where the cardio-vascular system presents marked weakness, or there are great and sudden extremes of blood-pressure. In these cases the tinnitus can, of course, only be considered as symptomatic, and, in the absence of distinct local disease, not causative.

In five cases there was a chronic otorrhœa or some trouble with the middle ear, and in one there was a mastoid sinus. In most of these six there was good reason to believe that the ear-trouble was, on the contrary, largely to blame for the epilepsy—as indicated by the order of development, and especially by increase of convulsions on increase or retention of secretions. In three of these (others not specified) the convulsions regularly began on one side or were wholly unilateral—and in at least one of these on the same side as the ear-trouble.

Treatment of such epileptics with ordinary remedies as the bromides has not been encouraging. As they were then usually referred to other departments for relief of the local trouble, the eventual outcome cannot be given. It is, however, certain that inflammatory processes in the ear are an important immediate cause in a small proportion. Of further cases, in one there were hallucinations of hearing, in one intercurrent otalgia, in one sudden deafness, and in one there was unilateral deafness.

(11).—MOTOR DISTURBANCES.

It is well known that epileptics are often very strong so far as their gross muscular power is concerned,[6] the spasmodic movements possibly acting as a kind of auto-gymnastics. This, however, applies rather to any transient exhibition of their strength than to sustained effort. Certain it is that weakening indulgences and excesses tend to increase the seizures. Many are chronically languid, tired. Some patients only suffer when exposed to such special cause, *e. g.*, after over-use of alcoholics, or when exhausted by manual labor (evidently the Ermüdungs-epilepsie of Solomon).

The first three of the following forms were collectively termed by Reynolds, "Involuntary Muscular Contractions."

(*a*) Tremor. There are two somewhat distinct forms of tremor in epileptics: one a paroxysmal manifestation, the other an interval symptom. The latter is of importance, as in some cases it is thought to be dependent on degeneration in the pyramidal tracts. When strictly unilateral, or as in one case affecting a single extremity, such a degeneration is a fair supposition—but it is not as easy to assume this for the cases of equal general tremor, and certainly not for the paroxysmal form. It is also common in the Jacksonian type of seizures. Its frequent occurrence as a purely interval symptom, and the pupillary hippus above described, suggest also a comparison with multiple sclerosis.

In twelve of the last eighty-five cases there was some form of tremor, usually very pronounced. It was increased on excitement, and belongs to the intention type (best shown by attempted steady extension, *i. e.*, fixation of muscles). It seems to have no relation to age, sex (6 m., 6 f.), or previous duration of the epilepsy. It is commonly a fine rapid tremor, but otherwise varies much. It six it was more or less unilateral (exclusively so only in three Jacksonians, but in another distinct Jacksonian the tremor was bilateral); in one it was more an unsteadiness of the hands than a distinct tremor. In other cases, not here included, it occurred only as a premonitory sign of seizure. Its bearing on prognosis does not seem to have been studied, although apparently bad yet such cases have proven about as amenable to treatment as the average.

This sign was noted by Reynolds in fifty per cent. of his cases,—constant or occasional, variable in extent and intensity from tremulousness to well marked vigors.

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[6] Féré, it is true, found a reduction of the general strength, but this ay hamev been due to his class of cases.

Féré (1889) has made a careful study with tracings of the muscular weakness and tremor in various epileptics, —principally, however, about the period of the attack, or else in hemiplegic and hemichoreic cases. From his observations it appears that the tremor is greatly increased by, if not largely dependent on general excitement or local stimulation. More recently (*Rev. de Med.*, 1891, pp. 513–522), he has reported two peculiar cases of attacks of trembling in epileptics, and says that these may differ widely in character. Epileptics subject to habitual trembling do not appear, according to him, more liable to this form of crisis than do others. The tremor of the hand in one of his cases showed seven to ten oscillations a second, that of the foot being always a little slower. In the other case (tremor in triceps of right thigh) there were six to seven vibrations per second.

(*b*) Various slight spasmodic contractions—especially so-called "starts"—are very common. Of course, these verge closely on the choreic. They may not be sufficient to move a whole extremity, may not be noticeable unless an exposed area be closely watched or the person be under continuous observation, and are often not known to the patient until attention is directed thereto. Again, they involve the whole body—the form common to many persons at night. Occasionally they are most troublesome just on awakening. An increase in the number of these starts, particularly if diurnal, is a strong indication of an impending seizure, and thus a therapeutic warning.

Reynolds noted some clonic spasms in fifty-seven per cent. of his cases.

(*c*) Epilepsy and chorea. That there is some connection between these two disorders has been variously recognized. Only a few of the facts bearing thereon will here be mentioned. Each is a motor neurosis, and either may be the antecedent of the other.

1. The choreiform movements of epileptics present a considerable variety of type, ranging from the just mentioned clonic spasms to typical chorea minor (fourteen

cases of the present series). Reynolds says: "In several children I have noticed a more or less constant condition of choreic movements, these being much exaggerated some days prior to an attack."

It is a question whether in these cases the motor condition shall be considered as ordinary chorea. Rarely it seems to be the common form of childhood; but as it is usually a typical, less severe, and indefinite in duration, it is probably, in most cases, a parallel to hemichorea from brain disease—only that in the epileptic it is more general. Different parts of the body may be unequally affected. Sometimes the twitching is about the head and shoulders; again mostly in the extremities. In one it was only on the nonparetic side, in another on the side primarily convulsed, and in a third it was more on one side than the other.

2. In rare cases (two) there was an alternation, a period of chorea, then one of epileptic seizures; presently the chorea again, and so on. This may even lead to amusing blunders and confusion in diagnosis. Trowbridge also refers to such cases. Another patient had been a choreic in younger years.

3. Family chorea, choreic heredity. In four cases, at least, a sister or brother had suffered from chorea, doubtless chorea minor.

Putzel (1880, p. 62) gives chorea as one of the antecedents of epilepsy, and also mentions chorea and epilepsy, respectively, in two brothers, with a history of insanity in a great grand-aunt.

Recently, Remak (*Neurolg. Centbl.*, June, 1891), has published a case of hereditary chorea in a man who had suffered from epilepsy some years previously; and also refers to Hoffmann's earlier cases combining both troubles. Jolly (*ibid*) also mentions a girl of eleven years in the same family as Remak's case, showing both chorea and epilepsy; and Bernhardt adds a case of chronic chorea, where father and grandfather were epileptics. Comby, of Paris, has also (1891) noticed epilepsy in the antecedents of choreics.

For comparison, Goodall (*Guy's Host. Rpts.*, *v.* *Bkln. Med. Jrnl.*, September, 1891) may be quoted. He found that in 28 of 262 cases of chorea, "the family history showed chorea in mother, brother or sister."

G. R. Trowbridge, of Danville (*Alien. and Nrlgst*, January, 1892, pp. 45-63), has collected and added sixteen cases on this subject. His conclusions are:

"1. There is an intimate relation between epilepsy and chorea, both diseases being due to disturbances of the motor and intellectual centers of the brain, which differ only in the degree of intensity.

"2. Chorea predisposes towards epilepsy, and epilepsy towards chorea—the former being the most frequent condition.

"3. Chorea in one generation may be transmitted as epilepsy in the next or succeeding generations, or the epilepsy may appear first and the chorea in the following generations.

"4. That a neurotic taint in the parent or parents may make one child choreic and another epileptic.

"5. The diseases may exist simultaneously, but in these cases they are in inverse ratio, *i. e.*, the more violent the chorea the less frequent and severe the epileptic convulsions; and *vice versa*, the more violent the epilepsy the less marked are the choreic movements.

"6. That in cases of chorea and epilepsy there is more or less mental impairment."

However, such writers, to some extent, overlook the different course of ordinary chorea minor from that of epileptic chorea, the latter more comparable to "hereditary chorea."

The direct therapeutic demands of the choreic manifestations are essentially those of the main trouble. If it be a true chorea attack in an epileptic, the indications are the same as in uncomplicated chorea. Otherwise, where, as is usually the case, the irregular choreiform movements occur, they are as controllable by the bromides as is the epilepsy itself. In some cases arsenic seems to be of value. It is, of course, one of the recognized antepileptics, and, by some, is specially praised as a preventive of bromidism. It is in this latter sense that Agostini recommends it in skin-troubles in epileptics. These indications are almost as much for its general employment as for its value in particular cases.

(*d*) General uneasiness (a habit of never sitting still, of moving about, of picking at things) is frequent, though this is so common among children in general as to make it of less significance. The allied conditions of ocular and possibly pupillary unrest have already been considered.

"Unstable" characterizes the epileptic in all respects.

Occasionally, a patient is recognized to have periods of "pig-headed obstinacy," not maliciousness, but an imperative tendency to follow any unaccountable whim. This may either be more or less continuous, or oftener bears some relation to an attack, either as a premonition or as a *petit mal*. In some it approaches the type called procursive epilepsy.

(*e*). Paralyses, pareses and contractures. Those observed in epileptics are usually either manifestations of organic brain disease, or after-effects of the convulsions. Still, in fact, they represent a mixed lot of peripheral and central cases.

Exclusive of the form limited to an eye-muscle and already described, there were fourteen cases of this class (not to mention a slight facial hemiatrophy, general weakness, or for completeness a wooden leg). Hemiparesis occurred in four, arm-paresis in two, facial in two, peronei-paresis, incipient tabes,[7] para-paresis, deviated uvula, retracted toe, and lordosis, each one. In several of these the local trouble developed at some convulsion, and has persisted since, or more rarely is temporarily aggravated by the seizures.

One peculiar feature appears on adding my four hemiplegic (respectively hemiparetic) cases to five seen at the asylum. This shows that eight (7 m., 1 f.) were affected on the left to only one (woman of sixty) on the right. This may well be accidental, yet the number is large enough to suggest that it represents some actual fact—perhaps the greater vulnerability of the weaker right side of the brain.

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[7] As epileptiform attacks are not rare in progressive dementia, it is not surprising that they occasionally appear in the related tabes. And several cases in ataxics have been published.

Partial and transient motor loss as a direct sequence of the convulsions, may also be mentioned here.

Bourneville (1873) noticed that hemiplegia of the cerebral type may occur in *status epilepticus*. Ssikorski (reported in *Neurolg. Centbl.*, April, 1891), asserts "that he has observed on a large number of epileptics (sixty to seventy per cent.) a phenomenon that permits with some probability the establishment of the diagnosis independent of the attacks. This is a diminution of motility in one-half of the body, especially paresis of the mimetic movements in one-half of the face. On the paretic side the palpebral fissure appears dilated, the nostrils narrower. The weakness usually affects the side on which during the attacks the convulsions begin."

So far as the grip (dynamometer) is concerned, this was not found to hold in the cases where the attacks at times began in a hand or arm. Slight ptosis in a couple of cases served rather to narrow than dilate the palpebral fissure.

Contractures, instead of pareses, as post-paroxysmal occurrences, have been reported by Lemoine.

(*f*) Speech impediment or defect. In all there were twelve cases of this; the trouble in three of these being worse for a time after each seizure. Aphonia following a fit, and even lasting until the next one, is mentioned by Romberg. No single special type predominated in the above. In three the main feature was a lisp; in two partial aphasia; in two unintelligible pronunciation, then stammering, inability to combine certain sounds, etc. Of the twelve, there were ten under eighteen years of age, showing an overproportion amongst youthful epileptics. Of course, a few of these showed other evidence of brain defect or weak-mindedness. In one the trouble developed under observation.

(12).—SENSORY DISTURBANCES.

1. Considerable headache, *independent of the seizures*, is a frequent complaint. It is, of course, also common just after an attack, and sometimes occurs as a prodromal. But as a more or less continuous or frequent symptom in the free interval, it was noted in thirty-three cases, fourteen of these being males. Still others suffered occasionally. Where the location was specified, it was nearly always frontal (eighteen frontal, a couple of others partially so, two more or less temporal and unilateral, two vertical, eleven indefinite). The predominance of the frontal site is so great as almost to constitute this the typical form of the epileptic interval. Indigestion, nicotine poisoning, eye strain, acute sexual exhaustion, and epilepsy cause, preferably frontal headache,—evidently having cerebral exhaustion as a common element.

In twenty-one other cases it is specifically stated that there was no or but very rare headache (11 m., 10 f.). A comparison shows that this is proportionately less frequent in the older epileptics, but three of the thirty-three sufferers being over thirty years of age, as against forty in the whole series of one hundred and fifty. Evidently this headache cannot be figured as a chronic after-effect of the convulsions,—firstly, because care was taken in enquiring, to distinguish the cases where the headache was either post-convulsive or sharper at that time; secondly, because a comparison of the cases shows that those with long intervals had suffered quite as much and continuously as the rapid fire cases. This, also, negatives the general applicability of the view approved by Putzel, that blows on the head in falling are one important factor. Happily, it can be said, that these headaches of epileptics are very responsive to treatment. This, however, has simply to follow the general lines for the case as one of epilepsy. Sometimes the relief is immediate and continuous, again it is gradual.

Recently, Kreuser (reported in *Neurolg. Centbl.*, 1891, p. 740), has investigated the "pressure-sensitiveness of the cranial sutures" in health and disease. For epileptics he found such tenderness absolutely more frequent than in healthy persons, decreasing as the age the duration of the sickness and the mental deterioration increased. It was not regularly increased after single or frequent attacks. More often than in other investigated cases there was in epileptics an asymmetrical state and radiation of the sensation to a greater distance. The sagittal suture and the sites of the former fontanelles were commonly most sensitive.

2. Pain and paræsthesiæ,—other than headache. Patients frequently tell of peculiar sensations, of near objects appearing transiently distant, of pains and indefinite feelings that can best be classed as paræsthesiæ (not of the Jacksonian type, but occurring irregularly, first in one part, then in another). These sensory phenomena seem at times to bear some relation to a full seizure (pre- or post-signs); or when associated with confusion of thought, they doubtless represent a minor attack. Dizziness is very common, and usually, though often falsely attributed to *petit mal.* Pain about the cardiac region Tinnitus aurium have already been considered. A lump in the throat or a feeling of something rising is suggestive of an aura or of hysteria, but may be more or less continuously troublesome in epileptics presenting no other manifestation of hysteria.

3. Sensory loss. Visual limitation has already been considered. Féré finds that about sixty of every hundred epileptics examined showed diminished appreciation of odors and flavors.

Gottardi (1881) concluded that tactile sensibility, as determined by Weber's compass immediately after an epileptic attack, is of no value as a means of diagnosis. But Thomsen and Oppenheim have found sensation to be greatly reduced in old epileptics. The sensory impairment of epileptics is evidently on a par with the degree of their intellectual weakness. In two of the present cases it was stated that the patient never heeded pain, as from cuts or burns. One of these was a weak-minded girl, long epileptic; the other was a boy who, although less weak mentally, was so clumsy as to be unable to button his clothes. Neither was at all ataxic, and each seemed to feel pinching and pricking about as sharply as other children,—but any thorough examination was impracticable.

Roncoroni (1892) finds that disturbances of sensation are most frequent in the epileptic insane, then in the melancholic, and least in the maniacs.

As an amusing sensori-motor item, it might be mentioned that one boy's mother expressed her joy at the success of treatment, by explaining that now she could "lick him" to her heart's content without the access of a fit—something long previously impossible. She evidently made such use of the reclaimed possibility that—although he certainly deserved well at her hands—I almost regretted his improvement.

(13).—REFLEXES.

Ziehen (1889) says that in adults the presence of ankle-clonus, without other marked objective symptoms, should always suggest epilepsy or neurasthenia. Ankle-clonus and exaggerated knee-jerk occurred in sixty per cent. of his cases of epilepsy, while the plantar reflex was often weak. However, in a considerable number of my cases examined therefor, not one showed any suggestion of ankle-clonus. And as regards the patellar reflex, this was oftener (six times) found unequal than either increased or decreased. My observations on the plantar reflex are not sufficient to warrant any suggestion other than that on this point Ziehen may be right.

Beevor's observations on the reflexes in epilepsy (*Brain*, 1882), had reference to the convulsive period.

Drayton's statement (*l. c.*): "A relaxed state of the muscles, yet the responses of the reflexes to local irritation are abnormal or exaggerated;" is too general. And Agostini's paper ("Sulle variazioni della sensibilita generale a sensoriale e reflessa negli epilettici; nel periodo interparossistico e dopo la convulsione," 1890), is not at hand.

Bechterew, from studies with his "Reflexograph" (*Neurolg. Centbl.*, 1892, pp. 39–40), treats as follows of the tendon-reflexes in epileptics: "The patellar reflexes are changed in various ways and to a most striking degree. In many cases the reflexes were increased and at the same time usually unequal; but during the attacks of *grand mal* there was complete abeyance of the tendon-reflexes. In many cases they remained absent for some time immediately after the attack. In another series of cases a temporary increase of the reflexes or change in character of the curve (*i. e.*, of the reflexogramme) was found." But most of his article, so far as it relates to epileptics, is also devoted to the post-convulsive phenomena.

The pupillary reflex has already been considered and loss of the pharyngeal reflex as a symptom of severe bromidism is, of course, well known.

(14).—MENTAL PECULIARITIES.

These deserve a far more careful study and recapitulation than will here be attempted; indeed, extensive papers have been devoted to this phase of the subject. The present question in their interpretation is to determine, in any given case, whether they are simply results of the convulsions, or are coördinate symptoms (*i. e.*, practically convulsive phenomena), or finally are like the convulsions, but manifestations of a primary degenerative condition of the brain. The time of their original development, relative to that of the seizures, is important in determining this. If they antedate the latter some degenerative type is probable and the prognosis decidedly the worse. Again, the nature and severity of the mental disturbances usually give us evidence on this point. Impairment of memory is a common sequence of epilepsy; hypochondria and hysteria have been noticed as interval symptoms (Griesinger); whilst idiocy, alienation, dementia, coprolalia, echolalia, a habit of lying, etc., are of deeper significance and give the worst prognosis. Still, there is hardly one of these symptoms or conditions but may improve, and all but the worst are occasionally curable. Imbecility may be a result of long-standing epilepsy and then be more amenable to treatment. In the present series there were no real imbeciles, and but, perhaps, three who might fairly be classed as weak-minded.

Next come children that are termed "peculiar," that withdraw from playing or associating with their fellows, perhaps have somnambulistic tendencies, are inveterate masturbators, etc. The latter habit does not seem specially provocative of epilepsy, despite certain claims, but is rather an ominous sign of the mental condition. Certain forms of chorea, already alluded to, sometimes alternating with epileptic periods, presaging a seizure, or representing an irregular tic, darken the prognosis, though not absolutely. Obstinacy, moroseness, ugliness, uncontrollable temper, excessive irritability, restlessness, loquaciousness,[9] forgetfulness, and such other mental deviations may be transient and remediable; but when decided and settled conditions point to degenerative states (not necessarily dementia or imbecility at first).

Children that are simply weak or feeble-minded or backward have, of course, a less favorable outlook according as this represents a real mental defect. Such cases, however, should only be passed upon after due consider-

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[8] Epileptic and so-called post-epileptic insanity belong rather to the period of the attack (*i. e.*, are either substitutive or post-paroxysmal). This is the transitory insanity of certain epileptics (Wildermuth) as distinguished from the common chronic psychic degeneration. This latter is observed to follow more certainly and rapidly the mild paroxysms unattended by convulsions (Hammond).

[9] Relative to age and surrounding circumstances. It is not very frequent, but may be observed in either sex, and, although on a par with restlessness, is distinct from such forms of imperative utterance as coprolalia. Nor is it the "Epilepsy Loquax," described by Cheadle (1875, *v.* Hare,) as it is not an epileptic equivalent, but a more or less continuous manner of the patient in the free intervals. Hare (p. 21), in speaking of "Precursory symptoms other than auræ," says: "Still other cases are recorded in which an extraordinary loquacity asserted itself in men of a commonly morose or taciturn nature." Choking, spitting or talking in the attacks marked two of the present cases; *per contra* silence was a premonitor in one.

ation of the person's general condition and intellect in view of surroundings and privileges.

Here the advantage of mental treatment might be mentioned; *i. e.*, training of the patient's self-control. Moderate mental discipline assists in this respect, and helps, also, to weaken the attacks by drawing force from the explosions.

Seguin at one point (*l. c.*, p. 203), speaks of "the moral perversion which characterizes it (so few epileptics can be good, true or kind)." Heedless cruelty is sometimes shown; one boy killed a kitten without any purpose; another smashed a slate over a comrade's head on a slight provocation; and other like incidents might be added. It is this characteristic, combined with a bad temper, that makes some epileptics feared, even in their own home.

There is another trait that is more frequent in the brighter epileptics than in other children, though often enough noticeable in the latter also. It is oftenest discovered by chance, yet on gaining the patient's confidence and inviting a recital of their every-day life, the peculiarity may gradually appear. Practically, it is an inclination to do all manner of unhygienic acts, an inability to learn and follow the every-day rules of healthy living. In some this may be only a childish recklessness or wantonness, but more often these acts are done slyly. A child sits up in bed all night reading some book; one youth of puritanical training, when away at school, drank regularly a couple of bowlfuls of coffee at dinner and three or four cups at supper; girls will indulge in smoking, or stay late at balls; one young woman, "just to try it," indulged in paregoric that had been given to a child for sleep; girls are prone to eat immeasurable quantities of sweets or sours,—this not from any bulimic impulse; one girl would, at times, manage to go all day without eating, yet without reason and without attracting notice; another girl would get her feet wet and go about thus for hours; to attend exciting performances is another not rare hobby; in fact, indulgence in injurious "tricks" of any kind or degree. Of course, all children, and especially girls, are more or less given to these eccentricities; but in the same grade as these dispensary epileptics it can hardly be as common or as variedly and persistently practiced. In some other class or country this tendency might exhibit itself in other ways. Boys and adults need to be watched quite as closely as girls,—are even more difficult to detect, or at least to recognize as precocious and abnormal. When once told that it is injurious, the particular prescription is rarely transgressed (this, of course, should be verified by companion or parent who has been put on the watch). It is not the "showing off" of childhood, nor yet hysteria, since there is no effort to be seen by nor to appeal to others. It is not quite mischief, pure and simple, as it injures principally the patient's self and does not include selfishness. It is, perhaps, a fancy for excitement, or to appear bizarre to ones self, or more likely an easy yielding to any sudden fancy—vagary, caprice, whim—a lack of the mental inhibition that should follow from reason and logic even in persons of this age—possibly here again "unstable."

Whether this be a result of the disorder, or a part cause, or but the folly of youth, it is often a serious impediment to success in treatment. Not infrequently relapse, retrogression, or intractibility to remedies, has clearly been due to these follies. As even those constantly about the patient are usually unable to give the needed information, it becomes one of the most difficult phases to work out, and yet should be continuously borne in mind. How general this characteristic is in epileptics it would be difficult to say, but it is at least common.

(15).—SUMMARY.

In his "System of Medicine" (Am. Edt., 1880, I., p. 775), Reynolds reaches the "conclusion, that in a certain number (twelve per cent.) there is nothing, absolutely nothing, abnormal to be discovered during the intervals of the attack." In the present series, all the more carefully examined cases before middle life have shown some one or more, and usually several, deviations from normal types. Thus, owing to the more recently noted variations, and perhaps to improved plans of observation, even this remaining twelve per cent. of Reynolds is wiped out, and it may fairly be stated that all younger epileptics, on careful and repeated examination, show distinct deviations from the healthy norm. To a considerable extent these deviations are only such as may be discovered in many non-epileptics of like age. To record the observance of new manifestations in epileptics is not to say that they are diagnostically very characteristic. In glancing over the conclusions of various observers—as they from time to time appear in the journals—one cannot but note how often there has been an error in the belief that some pathognomonic interparoxysmal sign had been found. Certain pertinent questions arise here: 1. Are any of these, simply or collectively, in any sense characteristic of epilepsy? 2. Are they coördinate symptoms of the epileptic disorder, or are they causative of the same, or are they merely consequences?

It is not the special purpose of this paper to answer these questions. But so much may be said, viz., that as yet positive and general answers cannot be given. To some extent, as regards single symptoms or conditions, the queries have already been considered. None, either alone or combined, are strictly characteristic (pathognomonic), though several are relatively so, *i. e.*, they are much more common and pronounced in epileptics than in other apparently equally healthy individuals of the same age. They hardly suffice in any case to justify a positive diagnosis of epilepsy—in the absence of any knowledge of the convulsions, or of previous history—though in many cases they might constitute strong presumptive evidence.

As to their relation to the main trouble, it is clear that they are in varying degrees causative, coördinate, and sequential,—all three.

It is their status as causative or coördinate conditions that furnishes the basis on which to determine the continuance of treatment. The type and symptoms of the seizures are of but the slightest therapeutic interest,—except as to the general question of surgical versus medical means. That, on the contrary, the interval symptoms and conditions individually furnish many indications for treatment, has been above pointed out in connection with the study of each. But it is rather to their importance, taken in any case collectively, or so far as present, in giving us a warrant for the gradual cessation of medicinal treatment, that it is desired here to call attention. Commonly, the progress of a case is simply estimated by the varying number of seizures. The prime object in these observations has been to work out a plan whereby this can be followed and known without depending on the occurrence of attacks. These latter are universally recognized as strongly tending to perpetuate the convulsive habit. Hence, whenever our therapeutics can control such manifestations, if there is to be any chance of cure, it is that such control be continuous. It is in just such more hopeful cases that we soon find ourselves at sea for want of indications. Moreover, where anything like a cure is to be hoped for, treatment must, it is well known, be kept up for a long period after all such manifestations have been checked. It is in this free period that these interparoxysmal matters acquire their main value as guides. By them we can, in such cases as are controllable, keep a pretty good insight as to the underlying epileptic condition, and just as fast as this is found to improve we can reduce any one or all the drugs that are being administered, respectively, if necessary, increase them.

Of course, the present essay is but an attempt in the direction specified. If it be even an entire failure, the desideratum here outlined remains, and in any case there is much to be verified, and an ample field for further work.